

**Syllabus and Scheme for the Post of Junior Laboratory Assistant (Technical) f
School of Chemical Sciences**

Post Code- 003

Advertisement No. IIT Mandi/Recruit./NTS/2025/05 dated 17.12.2025

There will be two-stage examination.

Stage I: Written Examination (Objective type)

Stage II: Skill/Trade Test

Syllabus:

Atomic structure, chemical bonding and molecular structure

Significance of quantum numbers, shapes of s, p and d atomic orbitals, nodal planes, rules for filling electrons in various orbitals, electronic configurations of the atoms, stability of half-filled and completely filled orbitals, concept of exchange energy, relative energies of atomic orbitals, general characteristics of ionic bonding, Fajan's rules, bond moment, dipole moment, valence bond Approach, MOs of O₂ and N₂.

Basic organic chemistry

Inductive Effect, electromeric Effect, resonance and hyperconjugation, homolysis and heterolysis, nucleophiles and electrophiles, carbocations, carbanions, free radicals, organic acids and bases, aromaticity, Hückel's rule.

Reactions: Catalytic hydrogenation, Wurtz reaction, Kolbe's synthesis, Grignard reaction, Elimination reactions, Hoffman and Saytzeff's rule, Birch reduction, anti-Markownikoff's addition, Hydration, Ozonolysis, Oxymecuration-demercuration, Hydroboration-oxidation, Diels-Alder reaction, Benzoin condensation, Aldol reaction, Claisen rearrangement, Fries rearrangement, Cannizaro reaction, Paterno-Buchi reaction.

Spectroscopy: Basics of atomic and molecular spectroscopy, UV-vis spectroscopy, Fluorescence spectroscopy, NMR spectroscopy.

Lab related topics: Preparation of solutions: molarity, normality, ppm, buffer solutions, Acid–base titrations, redox titrations, complexometric titrations, Gravimetric analysis principles and practice, Calibration of glassware (pipettes, burettes, volumetric quantitative and qualitative analysis, Lab safety- principles and procedures, Safety data sheet, color of the cylinders, HAZMAT.

General topics:

English communication, general knowledge, reasoning., GFR rules

Important Instructions for candidates:

General information about the exam:

- The MCQs have negative marking for wrong answers. The unanswered questions will not be considered for evaluation. (*i.e.*, no marks will be awarded for any question not attempted).
- Only one best-suited answer has to be given for any MCQ. More than one answer will be treated as wrong answer.
- Use of only blue or black ballpoint pen is permitted to answer the questions and fill the form in the exam hall. Use of ink pen/gel pen/pencil/whitener is not permitted.
- Use of calculator, cell phones, log book, periodic table, and any type of electronic device etc., are strictly prohibited.
- Involvement in any malpractices will lead to disqualification
- Any additional instructions given during the selection process must be adhered/complied.

Final Selection:

- Examinations for Stage-I and Stage-II will be conducted for all the candidates or as decided by the selection committee.
- Final selection will be made on the scores obtained in the Stage-I, as the Stage –II is of qualifying nature. But if a candidate fails to qualify in Stage-II, her/his candidature will not be considered further.
- Please note that for consideration in the merit list, a candidate has to secure minimum marks fixed by the selection committee in both exams at Stage-I and Stage-II – failing which institute will not make an offer of appointment even if vacancies go unfilled.